Curriculum For General Electrician

(Certificate Level- 6 months)
# Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall objective of the course</td>
<td>3</td>
</tr>
<tr>
<td>Competencies gained after completion of the course</td>
<td>3</td>
</tr>
<tr>
<td>Job Opportunities available immediately and in future</td>
<td>3</td>
</tr>
<tr>
<td>Overview about the program</td>
<td>4</td>
</tr>
<tr>
<td>General Electrician Curriculum Contents</td>
<td>5</td>
</tr>
<tr>
<td>Module 1: Domestic Electrical Installation and Estimation</td>
<td>5</td>
</tr>
<tr>
<td>Module 2: Industrial Electrical Installation &amp; Troubleshooting</td>
<td>11</td>
</tr>
<tr>
<td>General Electrician Curriculum Contents</td>
<td>22</td>
</tr>
<tr>
<td>Module 1: Domestic Electrical Installation and Estimation</td>
<td>22</td>
</tr>
<tr>
<td>Module 2: Industrial Electrical Installation &amp; Troubleshooting</td>
<td>28</td>
</tr>
<tr>
<td>NCRC Members</td>
<td></td>
</tr>
</tbody>
</table>
Overall objective of the course

To produce the quality skilled work force for domestic / industrial sector of country to help reduce the poverty & increase the self employability.

Competencies gained after completion of the course

After completing the course the trainee will be able to:

- Carry out domestic/ Industrial Electrical Installations
- Install domestic/ Industrial Safety, Security and communication system
- Inspect, test, trace and repair fault in domestic/ Industrial Electrical Installations
- Prepare estimates for domestic/ Industrial Electrical Installations

Opportunities available immediately and in the future

Passed out may find out job opportunities in:

- Domestic Electrician shop as electrician
- Construction Industries as electrician
- Industrial low voltage electrical work shop
- Power Generation units
- Electrical equipment manufacturing firms
- Plant operations and maintenance
- Self employment as well as in public and private sector as an Assistant Electrician
Overview about the program – Curriculum for General Electrician

<table>
<thead>
<tr>
<th>Module Title and Aim</th>
<th>Learning Unit</th>
<th>Theory Day/hours</th>
<th>Workplace Day/hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Module 1: Domestic Electrical Installation and Estimation</strong></td>
<td>LU1: Fundamental of Electricity</td>
<td>15 Hours</td>
<td>36 Hours</td>
</tr>
<tr>
<td>Aim :</td>
<td>LU 2: Bench Work</td>
<td>15 Hours</td>
<td>36 Hours</td>
</tr>
<tr>
<td>On Successful completion of this module the trainee will be competent to work in the construction sector as a domestic electrician.</td>
<td>LU 3 Carry Out Domestic Electrical Wiring</td>
<td>15 Hours</td>
<td>110 Hours</td>
</tr>
<tr>
<td>At the end of this module the trainee how to install domestic wires / Safety /Security &amp; Communication System and Fault finding &amp; Repairing in Installation work.</td>
<td>LU4: Install Domestic Safety / Security and Communication System</td>
<td>15 Hours</td>
<td>65 Hours</td>
</tr>
<tr>
<td></td>
<td>LU5: Carr out Inspection, Testing, Fault Finding and Repair in Domestic Electrical Installation</td>
<td>09 Hours</td>
<td>26 Hours</td>
</tr>
<tr>
<td></td>
<td>LU6: Prepare Estimates For Electrical Installation</td>
<td>09 Hours</td>
<td>28 Hours</td>
</tr>
<tr>
<td>TEST</td>
<td>TEST</td>
<td>02 Hours</td>
<td>19 Hours</td>
</tr>
<tr>
<td><strong>Module 2: Industrial Electrical Installation &amp; Troubleshooting</strong></td>
<td>LU1: Industrial Electrical Installation</td>
<td>26 Hours</td>
<td>104 Hours</td>
</tr>
<tr>
<td>Aim :</td>
<td>LU2: Industrial Safety / Security and Communication System</td>
<td>06 Hours</td>
<td>30 Hours</td>
</tr>
<tr>
<td>On Successful completion of this module the trainee will be competent to work in the Industrial sector as an electrician.</td>
<td>LU3: Inspect, Test, Trace, and Repair Faults in Industrial Electrical Installation</td>
<td>12 Hours</td>
<td>48 Hours</td>
</tr>
<tr>
<td>At the end of this module the trainee how to install Industrial low voltage System and Fault finding &amp; Repairing in Industrial Installation work.</td>
<td>LU4: Install, Service and Repair Motors &amp; Generators</td>
<td>14 Hours</td>
<td>56 Hours</td>
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<td></td>
<td>LU5: Install, Service and Repair Electrical Control system &amp; Protective Switch gear</td>
<td>12 Hours</td>
<td>48 Hours</td>
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<tr>
<td></td>
<td>LU6: Prepare Estimates For Electrical Installation</td>
<td>04 Hours</td>
<td>20 Hours</td>
</tr>
<tr>
<td>TEST</td>
<td>TEST</td>
<td>02 Hours</td>
<td>18 Hours</td>
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</table>
# General Electrician Curriculum Contents

**Module 1 Title:** Domestic Electrical Installation and Estimation  
**Objective of the Module:** To produce the quality skilled work force for domestic sector of country to help reduce the poverty & increase the self employability  
**Duration:** 400 Hours  
**Theory:** 80 Hours  
**Practice:** 320 Hours

<table>
<thead>
<tr>
<th>Learning Unit</th>
<th>Learning Outcomes</th>
<th>Learning Elements</th>
<th>Duration</th>
<th>Tools/Material Required</th>
<th>Learning Place</th>
</tr>
</thead>
</table>
| LU 1: Fundamental of Electricity | On completion of this module the trainee should be able to:  
  - Know the Structure of Atom  
  - Conductor, Insulator, Semi Conductor and their properties | i. Explain and construction of Atoms  
ii. Explain electron, protons and neutrons  
iii. Differentiate between conductor, insulators and semiconductors | 06 Hours |  
| 2: Ohm's Law |  
  - Concept of resistance  
  - Laws of resistance  
  - Relation between I, V and R | i. Describe the relation between V&I, I&R when the resistance and voltage are remain constant respectively | 06 Hours | Teaching Aids.  
  
| 3: Series Circuit |  
  - Connections of Resistances  
  - Properties of Series Circuit | i. Describe the properties of series circuit  
ii. Behavior of voltage current and resistance | 06 Hours | Work Shop /Class Room  
| 4: Parallel Circuit |  
  - Connection of resistances  
  - Properties of parallel circuit | i. Describe the properties of | 06 Hours |  

| 5:Series and parallel (combined circuit) | Connections of resistances  
Trade calculations of Series and parallel Circuit | parallel circuit  
ii. Behavior of voltage, current, resistance and conductance  
i. Describe the combination of series and parallel circuit and their properties  
ii. Measuring Marking, cutting, filing. | 06 Hours |
| LU 2: Bench Work | Make the I and L type terminal plate | Drilling, countersinking, champ ring | 72 Hours |
| LU 3: Carry out Domestic electrical installation | Know safety rules and regulation in electrical installation works.  
Know the Various types of tools and Testing / Measuring Instrument and their uses in domestic installation | Take suitable measures in the event of electrical installation hazards.  
Implement rules and regulations in domestic electrical works  
Use proper safety equipment and wears essential in electrical installation works | 15 Hours |
| | | Implement appropriate procedures in the event of a workshop accident  
Describe various tools used in domestic Installation  
Describe various testing / measuring instrument used | 15 Hours |  
Electrician tool kit complete with AVO |
| Know how to interpret electrical working diagram in given situations | iv. Use proper tool and testing / measuring instrument in carrying out domestic installation work  
v. Maintenance of various Tools& testing / measuring instruments |
| --- | --- |
| 15 Hours | i. Make installation diagram using electrical engineering symbols  
ii. Use different scales in working drawing  
iii. Locate the position of the various accessories on a drawing  
iv. Describe all the electrical accessories required for a job from working drawing  
v. Make the distribution system from a drawing |
| 30 Hours | i. Describe common types of protective devices.  
ii. Installation and application of circuit breaker and fuses in electrical installation  
iii. Determine current rating of fuses.  
iv. Take suitable measure for proper earthing.  
v. Implement the regulation relating to various types of protective devices.  
vi. Use current and voltage meter & Mugger  
Soldering lead and fluxes  
Vices  
Control and protective switchgear used in domestic electrical installations  
Wires and cables  
Electrical conduit  
Anchor bolts  
Insulation tape  
Draw-wire/ tape etc.,  
PVC Surface/ conduits  
Soldering iron (40-100watts)  
Compression tools  
Measuring tape  
Electrical accessories  
Wiring accessories  
Flexible cords  
Raw plugs  
Cable lugs  
Nails, screws  
Steel Scale  
Pencil  
Eraser  
Pointers  
Highlighter |
| Know different types of Domestic Electrical wiring | Explain the concept of surface wiring.  
 ii. Determine correct types and sizes of cables used for domestic installation.  
 iii. Implement the relevant statutory regulations regarding surface wiring  
 iv. Use proper tools for carrying out domestic installation.  
 v. Apply the regulation of IEC on domestic wiring.  
 vi. Explain the meaning of conduit  
 vii. Determine the suitability of conduit installation.  
 viii. Install different types of conduits; steel conduit, flexible conduit and PVC conduit.  
 ix. Application of stuck and dice hacksaw etc.  
 x. Implement appropriate procedures for preparing conduit installation.  
 xi. Use of running coupler, conduit boxes, bend elbows, tees, and other accessories for conduit work  
 xii. Determine set and bend permissible radial length.  
 | 30 Hours |
| LU4: Carry out Inspection, Testing, Fault Finding and Repair in Domestic Electrical Installation | terminations of cable and the safety precautions involved. | tools and materials related to cable jointing.  
ii. Use proper tools and materials related to cable jointing and termination such as soldering bit, blow lamp etc  
iii. Recognize different types of insulating materials e.g. PVC cables etc.  
iv. Identify different types of conductors e.g. Copper, Aluminum, etc  
v. Take the suitable conducting materials for a specific work.  
vi. Connect the appliances and accessories into their terminal correctly.  
vii. Implement the safety regulation involved in joints and termination operations | 20 Hours |
|---|---|---|---|
| LU4: Carry out Inspection, Testing, Fault Finding and Repair in Domestic Electrical Installation | • Understand the sequence of inspecting and testing domestic installation.  
• Know the types of electrical fault and how to rectify. | • Apply statutory safety regulations for life, properties and environment.  
• Visually detect electrical and mechanical loose connections.  
• Perform three types of electrical installation test | 30 Hours |
| | | • Inspect different types of electrical faults in domestic installation. | 20 Hours |
| | | • Electrician’s tool kit  
• Measuring instruments (AVO meter, Meager, earth tester).  
• Soldering lead and fluxes  
• Vices  
• Control and protective switchgear used in domestic electrical |
| LU5: Install Domestic Safety / Security and Communication System | Understand the Safety / Security and communication System | Installation of Various Types Safety / security and communication system.  
- Fire detection alarm circuit  
- Security protection devices  
- or bells, bell indicators and electrical openers  
- Domestic communication devices (inter com, CCTV camera etc) | 35 Hours |
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<tbody>
<tr>
<td>LU6: Prepare Estimates For Electrical Installation</td>
<td>Estimates For Electrical Installation</td>
<td>Follow appropriate procedure estimating purchase procedure, cost of materials, various charges like labor, stores, overhead tools, contingency etc.</td>
<td>37 Hours</td>
</tr>
</tbody>
</table>

- Understand the earthing system & defective earth.

- Inspect earth leakage fault.
  - i. Inspect short circuit faults.
  - ii. Inspect over loading faults.
  - iii. Inspect insulation breakdown faults.
  - iv. Describe earth continuity conductor, earth lead & earthing rod.
  - v. Describe earth continuity conductor, earth lead & earthing rod.

- i. Install the earthing system and check the resistance.
- ii. Replacement of defective faulty earthing component.

- Install the earthing system and check the resistance.
- Replacement of defective faulty earthing component.

- Installments
  - Wires and cables
  - Electrical conduit
  - Anchor bolts
  - Insulation tape
  - Draw-wire/ tape etc.,
  - PVC Pipe / duct
  - Soldering iron (40-100 watts)
  - Lugs punching tools
  - Measuring tape
  - Electrical accessories
  - Flexible cords
  - Cable lugs
  - Nails, screws

- Electrician’s tool kit
- Measuring instruments (AVO meter)

- Measuring Tape
- Calculator
- Stationary
- Layout Plans
- Manufacturer’s Specification
**Module 2 Title:** Industrial Electrical Installation & Troubleshooting  
**Objective of the Module:** The trainee will be competent to work in the Industrial sector as an electrician.  
**Duration:** 400 Hours  
**Theory:** 76 Hours  
**Practice:** 324 Hours

<table>
<thead>
<tr>
<th>Learning Unit</th>
<th>Learning Out Comes</th>
<th>Learning Elements</th>
<th>Duration</th>
<th>Material Required</th>
<th>Learning Place</th>
</tr>
</thead>
</table>
| **LU1: Industrial Electrical Installation** | On completion of this module, the trainee should: | i. Take suitable measures in the event of electrical installation hazards.  
ii. Implement rules and regulations in domestic electrical works.  
iii. Use proper safety equipment and wears essential in electrical installation works.  
iv. Implement the appropriate procedures in the event of a workshop accident | 15 Hours | Electrician’s tool kit  
- Multi-meter  
- Material required for the installation  
- Insulation resistance tester  
- Wires and cables  
- Personal protective equipment | Work Shop / Class Room |
| | Know safety rules and regulation in electrical installation works. | i. Describe various tools used in industrial Installation  
ii. Describe Various testing / measuring Instrument used in industrial installation  
iii. Use proper tool and testing / measuring instrument in carrying out industrial installation work  
iv. Maintenance of various | 15 Hours | | |
| | Know the Various types of tools and Testing / Measuring Instrument and their uses in domestic installation | | | | |


<table>
<thead>
<tr>
<th>Know how to interpret electrical working diagram in given situation.</th>
<th>Tools &amp; testing / measuring instruments.</th>
<th>15 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Make installation diagram using electrical engineering symbols.</td>
<td>i. Take suitable points that make up an Electrical working diagram.</td>
<td>10 Hours</td>
</tr>
<tr>
<td>ii. Use different scales in working drawing.</td>
<td>ii. Install:</td>
<td>25 Hours</td>
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<tr>
<td>iii. Locate the position of the various accessories on a drawing.</td>
<td>a. Simple surface wiring for industrial installation</td>
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<tr>
<td>iv. Describe all the electrical accessories required for a job from working drawing</td>
<td>b. Conduct wiring for industrial installation</td>
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<tr>
<td>v. Make the distribution system from a drawing</td>
<td>ii. Implement the safety measures as provided for by the prevailing statutory regulations in carry the above.</td>
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<tr>
<td>Know different types of industrial installations.</td>
<td>i. Describe ducts and trunking systems.</td>
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<tr>
<td>Know the installation of different types of ducts and trunkings applying all relevant regulation and safety precautions.</td>
<td>iv. Distinguish the</td>
<td></td>
</tr>
</tbody>
</table>
Know the types of joints, terminations of cable and the safety precautions involved

| i. | Describe different types of tools and materials related to cable jointing. |
|    | 15 Hours |
| ii. | Use proper tools and materials related to cable jointing and termination such as |

advantages and disadvantages of ducts and trunking in industrial electrical installation.

v. Install the different types of ducts and trunking

vi. Selection, use and maintenance of tools and equipment used for ducts and trunking systems.

vii. Installation of different types of bus-bar trunking.

viii. Perform how to bend, set, shape, file and fabricate accessories used in connection with ducts and trunkings using the appropriate tools and equipment.

ix. Perform how to join lengths of ducts and trunking.

x. Determine the importance of earth continuity and ensure its provision on all types of ducts and trunking.
<table>
<thead>
<tr>
<th>Know the installation of all types of electrical machines and equipment.</th>
</tr>
</thead>
<tbody>
<tr>
<td>soldering bit, blow lamp etc</td>
</tr>
<tr>
<td>iii. Recognize different types of insulating materials e.g. PVC cables etc.</td>
</tr>
<tr>
<td>iv. Identify different types of conductors e.g. Copper, Aluminum, etc</td>
</tr>
<tr>
<td>v. Take the suitable conducting materials for a specific work.</td>
</tr>
<tr>
<td>vi. Connect the appliances and accessories into their terminal correctly.</td>
</tr>
<tr>
<td>vii. Implement the safety regulation involved in joints and termination operations</td>
</tr>
</tbody>
</table>

| i. Perform the different levels of controlling machine e.g. direct–on–line, autotransformer, star–delta, capacitor start, root resistance starters. |
| ii. Make an electrical control circuit consisting of a start/stop station, overloads, two-3phasemotors (which have isolating switches). One of the motors is attached to a pump, and the other is driving a pressure tank that has a high pressures witch. |
| iii. Make different types of | 20 Hours |
| Understand various methods of controlling electrical machines and equipment. | connection e.g. Star – Delta, Delta – Star, etc | i. Arrange the different types of repair, e.g. routine repair, corrective, etc.  
ii. Provide repair procedure for each item and types equipment and machine.  
iii. Use various types and grades of lubrications e.g. grease, oil, and coolant etc. properly.  
Operate various types of tools and equipment used for Repair: grease gum, oilcan, screwdriver, pulley extractors, wrench, and blower, filler gauge. | 15 Hours |
<table>
<thead>
<tr>
<th>LU2: Inspect, Test, Trace, and Repair Faults in Industrial Electrical Installation</th>
<th>Understand the sequence of inspecting and testing industrial installation.</th>
</tr>
</thead>
</table>
| **Know methods of maintaining electrical machines and equipment.** | **i.** Apply statutory safety regulations for life, properties and environment.  
**ii.** Visually detect electrical and mechanical loose connections.  
**iii.** Perform three types of electrical installation test. |
| | 15 Hours  
Electrician’s tool kit  
- Multi-meter  
- Material required for the installation  
- Insulation resistance tester  
- Wires and cables  
- Personal protective equipment |
| | Work Shop / Class Room |
| **i.** Determine the suitability of different types of enclosures and their application e.g. totally enclosed, water proof and semi-enclosed, etc.  
**ii.** Describe the construction of a good foundation form mounting machines and equipment.  
**iii.** Mount properly AC and DC machines and equipment.  
**iv.** Select the correct size of cable for the appropriate machine installations.  
**v.** Select flexible conduit correctly for machine terminations.  
**vi.** Connect starter in the circuit properly. | 25 Hours |
| LU3: Industrial Safety / Security and Communication System | Understand the Safety / Security and communication System | Install the Various Types of Safety / security and communication system Fire detection alarm circuit / Burglar alarm system Security protection system industrial communication devices (inter com , Public address system CCTV camera etc) | 36 Hours | Electrician’s tool kit  
- Multi-meter  
- Material required for the installation  
- Insulation resistance tester  
- Wires and cables  
- Personal protective equipment | Work Shop / Class Room |
|-------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------|----------|-------------------------------------------------|-----------------|
| LU4: Prepare Estimates For Electrical Installation | Estimates For Electrical Installation | i. Follow appropriate procedure estimating purchase procedure, cost of materials, various charges like labor, stores, overhead tools, contingency etc. | 24 Hours | Electrician’s tool kit  
- Multi-meter  
- Material required for the installation  
- Insulation resistance tester  
- Wires and cables  
- Personal protective equipment | Work Shop / Class Room |
| LU5: Install, Service and Repair Motors & Generators | Understand the principles of operation of AC and DC machines and their applications. | i. Describe the principle of operation & operate each of the following machines:  
   a. DC motor  
   b. DC generator  
   c. AC motor (Single phase & three phase)  
   d. AC generator (Single phase & Three phase).  
   ii. Describe the constructional features of:  
        a. DC machines  
        b. AC machines (Single phase & Three Phase)  
        c. AC generator (Single phase & Three phase).  
   iii. Differentiate between:  
        a. DC and AC motors  
        b. DC and AC generators. | 20 Hours | Electrician’s tool kit  
   • Multi-meter  
   • Material required for the installation  
   • Insulation resistance tester  
   • Wires and cables  
   • Personal protective equipment. | Work Shop / Class Room |
|---|---|---|---|---|---|
| Know methods of maintaining electrical machines and equipment. | i. Determine the suitability of different types of enclosures and their application e.g. totally enclosed, water proof and semi-enclosed, etc.  
   ii. Describe the construction of a good foundation for mounting machines and equipment.  
   iii. Mount properly AC and DC machines and equipment. | 25 Hours |---|---|---|
| **Know faults in machines, equipment, installations and their remedies** | **iv.** Select the correct size of cable for the appropriate machine installations.  
**v.** Select flexible conduit correctly for machine terminations.  
**vi.** Connect starter in the circuit properly.  
| **i.** Detect causes of breakdown e.g. short circuit, open circuit, worn out parts, insulation breakdown, incorrect use, and overload, ageing, etc  
**ii.** Inspect and clarify the causes of faults e.g. fuse melting, circuit breaker tripping, etc.  
**iii.** Determine fault by noise symptoms.  
**iv.** Interpret circuit diagram | **25 Hours** |
| **LU 6: Install, Service and Repair Electrical Control system & Protective Switch gear** | **Know the Various types of Control system & Switchgear and their uses in domestic installation** | **i.** Use proper electrical tools for wiring purpose  
**ii.** Use proper electrical measuring instruments during testing electrical installations  
**iii.** Install different types of electrical wiring systems for industrial purposes.  
| **i.** Install different types of | **10 Hours**  
Electrician’s tool kit  
- Multi-meter  
- Material required for the installation  
- Insulation resistance tester  
- Wires and cables  
- Personal protective equipment  | **Work Shop / Class Room** |
| **Know the trouble shooting &** | | **20 Hours** |
| Repair procedure of protective switch gear | electrical control systems and protective switch gear used in industrial electrical installations  
   ii. Install circuit breakers using correct ratings.  
   iii. Choose correct types of electrical wires and their ratings.  
   iv. Install appropriate types of industrial electrical accessories during installation electrical control systems and protective switchgear  
   v. Determine importance of testing & periodical inspections on electrical control systems & protective switchgear | 20 Hours |

| Know the Electrical legislation & regulation for Control system & protective switch gear | i. Implement proper troubleshooting and repair procedures in electrical control systems and protective switchgear  
   ii. Check & inspect Common faults in industrial power control and protection switchgear  
   iii. Use manual handling techniques  
   iv. Implement safe methods of handling heavy loads  
   v. Proper use Material handling devices | 20 Hours |
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</thead>
<tbody>
<tr>
<td>i.</td>
<td>Implement Electrical legislations and regulations related to electrical control system and protective switchgear</td>
<td></td>
<td>10 Hours</td>
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<tr>
<td>ii.</td>
<td>Take suitable measures for record keeping and reporting.</td>
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</table>
# General Electrician Curriculum Assessment

**Module 1 Title:** Domestic Electrical Installation and Estimation  
**Objective of the Module:** To produce the quality skilled work force for domestic sector of country to help reduce the poverty & increase the self employability  
**Duration:** 400 Hours  
**Theory:** 80 Hours  
**Practice:** 320 Hours

<table>
<thead>
<tr>
<th>Learning Unit</th>
<th>Theory Days / Hours</th>
<th>Work place Days / Hours</th>
<th>Recommended Formative Assessment</th>
<th>Recommended Methodology</th>
<th>Scheduled Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1-LU1</td>
<td>01 Hour</td>
<td>05 Hours</td>
<td><a href="#">List of formative assessment tasks</a></td>
<td>Question answers Method, Demonstration Method, Work Shop Method, Home Assignment, Project Method</td>
<td>As per Schedule</td>
</tr>
<tr>
<td>M1-LU1</td>
<td>01 Hour</td>
<td>05 Hours</td>
<td><a href="#">List of formative assessment tasks</a></td>
<td>Question answers Method, Demonstration Method, Work Shop Method, Home Assignment, Project Method</td>
<td>As per Schedule</td>
</tr>
<tr>
<td>M1-LU1</td>
<td>01 Hour</td>
<td>05 Hours</td>
<td><a href="#">List of formative assessment tasks</a></td>
<td>Question answers Method, Demonstration Method, Work Shop Method, Home Assignment, Project Method</td>
<td>As per Schedule</td>
</tr>
<tr>
<td>M1-LU1</td>
<td>01 Hour</td>
<td>05 Hours</td>
<td><a href="#">List of formative assessment tasks</a></td>
<td>Question answers Method, Demonstration Method, Work Shop Method, Home Assignment, Project Method</td>
<td>As per Schedule</td>
</tr>
<tr>
<td>Module</td>
<td>Hours</td>
<td>Total Hours</td>
<td>Description</td>
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<tr>
<td>5: Series and parallel (combined circuit)</td>
<td>01 Hour</td>
<td>05 Hours</td>
<td>Describe the combination of series and parallel circuit and their properties</td>
<td></td>
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</tr>
<tr>
<td>M1- LU2 Bench Work</td>
<td>15 Hours</td>
<td>57 Hours</td>
<td>Measuring marking, cutting, filing, drilling, countersinking, hampering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1- LU3 Domestic Electrical Installation</td>
<td>03 Hours</td>
<td>12 Hours</td>
<td>Take suitable measures in the event of electrical installation hazards. Implement rules and regulations in domestic electrical works. Use proper safety equipment and wears essential in electrical installation works. Implement the appropriate procedures in the event of a workshop accident. Describe various tools used in domestic installation. Describe various testing/measuring instrument used in domestic installation. Use proper tool and testing/measuring instrument in carrying out domestic installation work. Maintenance of various tools &amp; testing/measuring instruments.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>03 Hours</td>
<td>12 Hours</td>
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- Question answers Method
- Demonstration Method
- Work Shop Method
- Home Assignment
- Project Method
| 03 Hours | 12 Hours | Make installation diagram using electrical engineering symbols.  
Use different scales in working drawing.  
Locate the position of the various accessories on a drawing.  
Describe all the electrical accessories required for a job from working drawing  
Make the distribution System from a drawing. |
| 05 Hours | 25 Hours | Describe common types of protective devices.  
Installation and application of circuit breaker and fuses in electrical installation.  
Determine current rating of fuses.  
Take suitable measure for proper earthing.  
Implement the regulation relating to various types of protective devices.  
Use current and voltage operated earth leakage circuit breaker, observing relevant regulations. |
| 05 Hours | 25 Hours | Explain the concept of surface wiring.  
Determine correct types and sizes of cables used for domestic installation.  
Implement the relevant statutory regulations regarding surface wiring  
Use proper tools for carrying out domestic installation. |
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<tr>
<th>4 Hours</th>
<th>16 Hours</th>
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| • Apply the regulation of IEC on domestic wiring.  
• Explain the meaning of conduit  
• Determine the suitability of conduit installation.  
• Install different types of conduits: steel conduit, flexible conduit and PVC conduit.  
• Application of stuck and dice hacksaw etc.  
• Implement appropriate procedures for preparing conduit installation.  
• Use of running coupler, conduit boxes, bend elbows, tees, and other accessories for conduit work  
• Determine set and bend permissible radial length.  

| • Describe different types of tools and materials related to cable jointing.  
• Use proper tools and materials related to cable jointing and termination such as soldering bit, blow lamp etc  
• Recognize different types of insulating materials e.g. PVC cables etc.  
• Identify different types of conductors e.g. Copper, Aluminum, etc  
• Take the suitable conducting materials for a specific work.  
• Connect the appliances and Accessories into their terminal correctly.  
• Implement the safety regulation |
| M1- LU4  | Carryout Inspection, Testing, Fault Finding and Repair in Domestic Electrical Installation | 05Hours | Carryout Inspection, Testing, Fault Finding and Repair in Domestic Electrical Installation | 25 Hours | ● Apply statutory safety regulations for life, properties and environment.  
● Visually detect electrical and mechanical loose connections.  
● Perform three types of electrical installation test  
● Inspect different types of electrical fault in Domestic Installation.  
● Inspect earth leakage fault.  
● Inspect short circuit faults.  
● Inspect over loading faults.  
● Inspect insulation break down faults.  
● Describe earth continuity conductor earthing lead and earthing rod  
● Install the Electrical earth and earthing resistance and part of earthing system  
● Defective Electrode and faulty / damage earthing electrode / conductor replaced |
| M1- LU5  | Install Domestic Safety / Security and Communication System | 05 Hours | Install Domestic Safety / Security and Communication System | 30 Hours | ● Installation of Various Types Safety / security and communication system  
● Photosensitive switches and movement sensor  
● Fire detection alarm circuit  
● Security protection devices  
● Door bells, bell indicators and electrical openers  
● Question answers Method  
● Demonstration Method  
● Work Shop Method  
● Home Assignment  
● Project Method  
As per Schedule. |
| M1- LU6 Prepare Estimates For Electrical Installation | 07 Hours | 30 Hours | • Domestic communication devices (inter com, CCTV camera etc) | • Follow appropriate procedure estimating purchase procedure, cost of materials, various charges like labor, stores, overhead tools, contingency etc. | • Question answers Method.  
• Home Assignment.  
• Project Method | As per Schedule |
**Module 2 Title:** Industrial Electrical Installation & Troubleshooting  
**Objective of the Module:** The trainee will be competent to work in the Industrial sector as an electrician.  
**Duration:** 400 Hours  
**Theory:** 76 Hours  
**Practice:** 324 Hours

<table>
<thead>
<tr>
<th>Learning Unit</th>
<th>Theory Days / Hours</th>
<th>Work place Days / Hours</th>
<th>Recommended Formative Assessment</th>
<th>Recommended Methodology</th>
<th>Scheduled Dates</th>
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</thead>
</table>
| M2-LU1  
 Industrial Electrical Installation | 3 Hours | 12 Hours | • Take suitable measures in the event of electrical installation hazards.  
• Implement rules and regulations in domestic electrical works.  
• Use proper safety equipment and wears essential in electrical installation works.  
• Implement the appropriate procedures in the event of a workshop accident | • Question answers Method  
• Demonstration Method  
• Work Shop Method  
• Home Assignment  
• Project Method | As per Schedule. |
| | 3 Hours | 12 Hours | • Describe various tools used in industrial Installation  
• Describe Various testing / measuring Instrument used in industrial installation  
• Use proper tool and testing /measuring instrument in carrying out industrial installation work  
• Maintenance of various  
• Tools & testing / measuring instruments. | | |
| | 3 Hours | 12 Hours | • Make installation diagram using electrical engineering symbols.  
• Use different scales in working drawing.  
• Locate the position of the various | | |
| 2 Hours | 8 Hours | accessories on a drawing.  
- Describe all the electrical accessories required for a job from working drawing  
- Make the distribution system from a drawing  
- Take suitable points that make up an Electrical working diagram.  
- Install:  
  a. Simple surface wiring for industrial installation  
  b. Conduct wiring for industrial installation  
- Implement the safety measures as provided for by the prevailing statutory  
- Regulations in carry the above.  
- Describe ducts and trunking systems.  
- Distinguish the advantages and disadvantages of ducts and trunking in industrial electrical installation.  
- Install the different types of ducts and trunking  
- Selection, use and maintenance of tools and equipment used for ducts and trunking Systems.  
- Installation of different types of bus-bar trunking.  
- Perform how to bend, Set, Shape, File and fabricate accessories used in connection with ducts and trunkings using the appropriate tools and equipment.  
- Perform how to join lengths of ducts |
|----------|--------|------------------|
| 5 Hours  | 20 Hours| Description of ducts and trunking systems.  
- Selection, use and maintenance of tools and equipment used for ducts and trunking Systems.  
- Installation of different types of bus-bar trunking.  
- Perform how to bend, Set, Shape, File and fabricate accessories used in connection with ducts and trunkings using the appropriate tools and equipment.  
- Perform how to join lengths of ducts |
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<tr>
<th>3 Hours</th>
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<th>4 Hours</th>
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</table>
| and trunking.  
- Determine the importance of earth continuity and ensure its provision on all types of ducts and trunking.  
- Describe different types of tools and materials related to cable jointing.  
- Use proper tools and materials related to cable jointing and termination such as soldering bit, blow lamp etc.  
- Recognize different types of insulating materials e.g. PVC cables etc.  
- Identify different types of conductors e.g. Copper, Aluminum, etc.  
- Take the suitable conducting materials for a specific work.  
- Connect the appliances and accessories into their terminal correctly.  
- Implement the safety regulation involved in joints and termination operations.  
- Perform the different levels of controlling machine e.g. direct-on-line, autotransformer, star-delta, capacitor start, root resistance starters.  
- Make an electrical control circuit consisting of a start/stop station, overloads, two 3-phase motors (which have isolating switches). One of the motors is attached to a pump, and the other is driving a |
<table>
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<tr>
<th>M2-LU2</th>
<th>3 Hours</th>
<th>12 Hours</th>
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<tbody>
<tr>
<td>Inspect, Test, Trace, and Repair Faults in Industrial Electrical Installation</td>
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- pressure tank that has a high pressure switch.
  - Make different types of connection e.g. Star – Delta, Delta – Star, etc.
  - Arrange the different types of repair, e.g. routine repair, corrective, etc.
  - Provide repair procedure for each item and types equipment and machine.
  - Use various types and grades of lubrications e.g. grease, oil, and coolant etc. properly
  - Operate various types of tools and equipment used for Repair: grease gum, oilcan, screwdriver, pulley extractors, wrench, and blower, filler gauge.

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<tr>
<th>M2-LU2</th>
<th>3 Hours</th>
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<td>Inspect, Test, Trace, and Repair Faults in Industrial Electrical Installation</td>
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- Apply statutory safety regulations for life, properties and environment.
  - Visually detect electrical and mechanical loose connections.
  - Perform three types of electrical installation test.

- Determine the suitability of different types of enclosures and their application e.g. totally enclosed, water proof and semi-enclosed, etc.
  - Describe the construction of a good foundation for mounting machines and equipment.
  - Mount properly AC and DC machines and equipment.
  - Select the correct size of cable for

- Question answers Method
  - Demonstration Method
  - Work Shop Method
  - Home Assignment
  - Project Method

- As per Schedule.
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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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<td>the appropriate machine installations.</td>
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<td>• Select flexible conduit correctly for machine terminations.</td>
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<td>• Connect starter in the circuit properly.</td>
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<td>• Inspect causes of breakdown e.g. short circuit, open circuit, worn out parts, insulation breakdown, incorrect use, and overload, ageing, etc</td>
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<td>• Detect the causes of faults and clarify them e.g. fuse melting, circuit breaker tripping, etc.</td>
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<td>• Determine fault by noise symptoms</td>
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<td>• Interpret circuit diagram</td>
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<tr>
<th>M2-LU3</th>
<th>Install the Various Types of Safety / security and communication system</th>
<th>6 Hours</th>
<th>30 Hours</th>
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<tr>
<td></td>
<td>• Fire detection alarm circuit / Burglar alarm system</td>
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<td>• Security protection devices system</td>
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<td>• Industrial communication devices (intercom, Public address system CCTV camera etc)</td>
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<td>• Question answers Method</td>
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<tr>
<th>M2-LU4</th>
<th>Prepare Estimates For Electrical Installation</th>
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<th>20 Hours</th>
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<td>• Follow appropriate procedure estimating purchase procedure, cost of materials, various charges like labor, stores, overhead tools, contingency etc.</td>
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